Comparisons Of Spawning Characteristics
By Origin and Channel Type
Among Spring Chinook Salmon

Mike Hughes: WDFW
Andrew Murdoch: WDFW
<table>
<thead>
<tr>
<th>Key</th>
<th>Channel type</th>
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<tbody>
<tr>
<td></td>
<td>Pool-riffle</td>
</tr>
<tr>
<td></td>
<td>Plane-bed</td>
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<tr>
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<td>Dune-ripple</td>
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Study Objectives

- Determine if spawning distributions differ between hatchery and natural-origin female spring Chinook

- Determine if spawning site and redd morphology characteristics differ between redds constructed:
  
  (A) By hatchery and natural-origin female
  (B) In pool-riffle and plane-bed channel types
Methods
Female Origin Identification And Tagging
Carcass Recoveries
PIT Tag Detections Associated With Live Fish
### Spawning Site Characteristics

<table>
<thead>
<tr>
<th>Trait/Symbol</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Channel type</td>
<td>Pool-riffle, plane-bed, dune-riffle</td>
</tr>
<tr>
<td>Habitat type</td>
<td>Pool, riffle, glide, pool tailout (redd-scale level)</td>
</tr>
<tr>
<td>Stream width</td>
<td>Wetted channel width (m)</td>
</tr>
<tr>
<td>Distance to bank</td>
<td>Distance for edge of redd to nearest wetted bank (m)</td>
</tr>
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</table>
Redd Morphology Measurements

*Relative substrate compositions of bowl and tail
Comparisons of spawning site and redd morphology characteristics

- Differences spawning sites and redd morphologies
  - Between origins
  - Within channel types and redd-scale habitats
  - Within origins
  - Between channel types
Results
Female Carcass Distribution

KS test: \( P < 0.001 \)

N = 1,125

N = 385
Female Distribution Relative To Channel Type

Female spawning distributions

- Plane-bed dominant
- Pool-riffle dominant

RKM
Sample Size Limitations By Origin and Channel Type

Histogram of multiple variables

Spreadsheet 37 10v*4648c

Dune-ripple Plane-bed Pool-riffle

Redds

Total (N = 4,664)
Measured (N = 943)

Known-origin redds

Total (N = 4,664)
Measured (N = 943)

Hatchery-origin
Natural-origin

Sample Size Limitations By Origin and Channel Type

Type

(509)
(112)
(2)
(8)
(294)
(18)

Hatchery-origin
Natural-origin

Known-origin redds

Dune-ripple Plane-bed Pool-Riffle
Differences By Origins In Pool-Riffle Channels

- Limited difference in spawning site and redd morphology detected between hatchery and natural origin females

- Differences detected in glide habitats ($\text{Wilks } \Lambda = 0.915 ; P < 0.001$)

- Hatchery-origin redds were smaller in size with shorter tail apex height and constructed by smaller females
Differences By Channel Type Among Hatchery-Origin Redds

10 - 30% difference in tail apex height

24 - 26% difference in bowl depth

25 - 30% difference in redd area

24 - 42% difference in channel location

Plane-bed
Pool-riffle
Summary

Female spawning distributions

Plane-bed dominant

Pool-riffle dominant

Location of Chiwawa Acclimation
Conclusions

Mother's spawning location (RKM)

[Graph showing the relationship between Hatchery-origin and Natural-origin offspring spawning locations (RKM).]

Ford et al. (2015)
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[Logo of Grant PUD]